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(54) Method and apparatus for controlling window blinds and awnings.

(57) In a method and an apparatus for controlling a motor used in the lifting and lowering operation of a window blind or an awning the rotation of the motor rotor is used for delivering signals to a signal receiving means. The signal receiving means in turn delivers signals to stop the motor at the end positions of the blind or awning.

FIG. 2

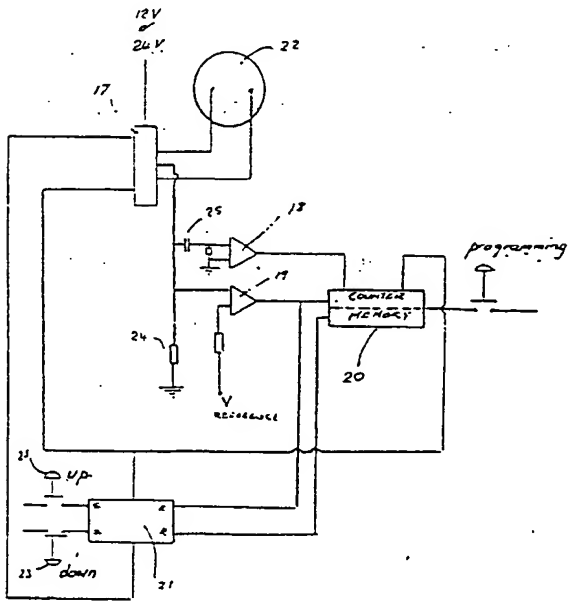

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Fig. 7 illustrates a typical electric circuit that can be used to detect the pulses in the cables leading to the motor and feeding them to the counter unit where they are added or subtracted. Unit 17 is a standard integrated circuit which is used to stop and start the motor. The connection between unit 17 and earth via resistance 24 causes a fluctuating voltage over resistance 24, which is proportional to the fluctuating motor current. This fluctuation voltage is coupled via condensor 25 to an integrated circuit 18 which amplifies the voltage pulses so that they can operate the counter unit 20.

Amplifier 19 compares the fluctuating voltage at resistance 24 with a reference voltage and when this voltage rises above the reference voltage, as will occur when the motor is nearly stopped then the amplifier sends a signal to the counter resetting it to zero. A signal is sent at the same time to switch 21, which stops the motor. Switches 23 are manually operated switches for raising or lowering the blind or awning.

For the small motors used in blind automation there will usually be three pulses for each revolution of the rotor. These pulses, or a proportion of them, are fed to the digital counting apparatus. The pulses are then used to control the blind motor in the following way:

Initial setting

The blind is raised to its highest position when the counting apparatus is set to zero.

The blind is then run to its lowest position when the sum of the pulses due to the motors rotation is stored in a memory. This value is then equivalent to the blinds lowest position.

After this the counter operates in the following way:

Operating

When the blind is lowered the pulses due to the motors rotation are summed up and when the number reaches the number stored in the memory the motor is stopped - the blind having reached its lowest or bottom position.

When the blind is raised the pulses due to motors rotation are subtracted and when the number of pulses recorded by the counter reaches zero the motor is stopped - the blind having reached its highest or top position.

It can be added that is has been found useful to have another system to check that the blind has reached its top position and not just to rely solely on the pulse counter being zero.

The electric current used by the motor is measured and when the blind is fully raised and can go no further the speed of the motor falls and the current to the motor increases rapidly. When the current has increased over a predetermined value then the blind is at its top position. The motor is then stopped and at the same time a signal is sent to the digital counting apparatus setting it to zero. This method of stopping the blind at its top position is generally preferred. This is because the counting apparatus is zeroed each time the blind is operated and the possibility for wandering of the set top and bottom positions caused, for example, by an accumulation of a small error in the counting of the pulses, is avoided. An additional advantage of zeroing the top position of the blind each time it is raised is that if the lifting cords or bands should streatch with time because of sunshine or because of heat or cold then there is an automatic compensation for this because the blind is always raised to its top position and then lowered a fixed distance, i.e. lowered a fixed number of revolutions of the winding axel or winding reel.

An interesting advantage of the system is that the lifting or lowering of the blind may be stopped in an intermediate position and when the raising or lowering is continued the blind continues to its correct end position. This is because the number of pulses equivalent to the intermediate position is retained in the counter while the blind is stationary and counting continues when the blind moves again.

If the system is used to control an awning instead of a blind then the fully rolled up position of the awning corresponds to the top position of the blind and the fully extended position of the awning corresponds to the fully down position of the blind. The awning has a direct current motor and gearbox installed in the winding tube which causes the tube to rotate. The pulses from the motor as it rotates are fed to a digital counting apparatus and the number of revolutions of the motor thereby known. The counting apparatus is zeroed at the fully rolled up position by measuring the current fed to the motor and setting the counter to zero when the current exceeds a set value. The awning is then fully extended and the sum of the pulses due to the motors rotation is stored in the memory. This value being used to stop the motor in future operations at the awnings fully extended position.

Claims

1. A method for controlling a motor used in the lifting and lowering operation of a window blind or the winding in and out of an awning, characterized in that the rotation of the motor rotor is used for delivering signals to a signal receiving means

FIG. 1

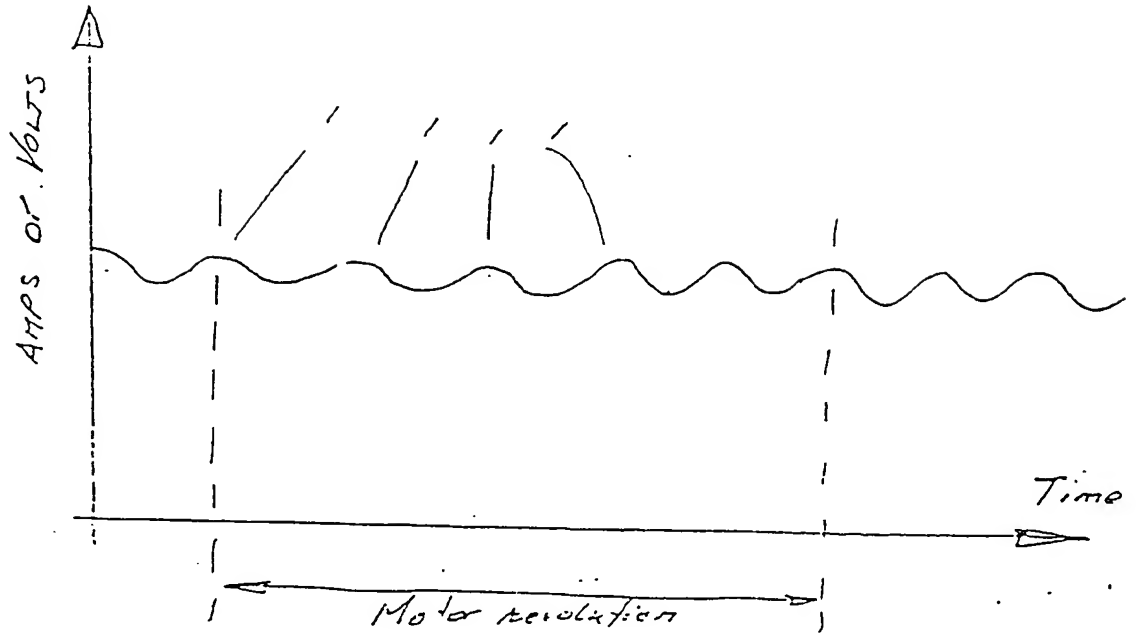


FIG. 2

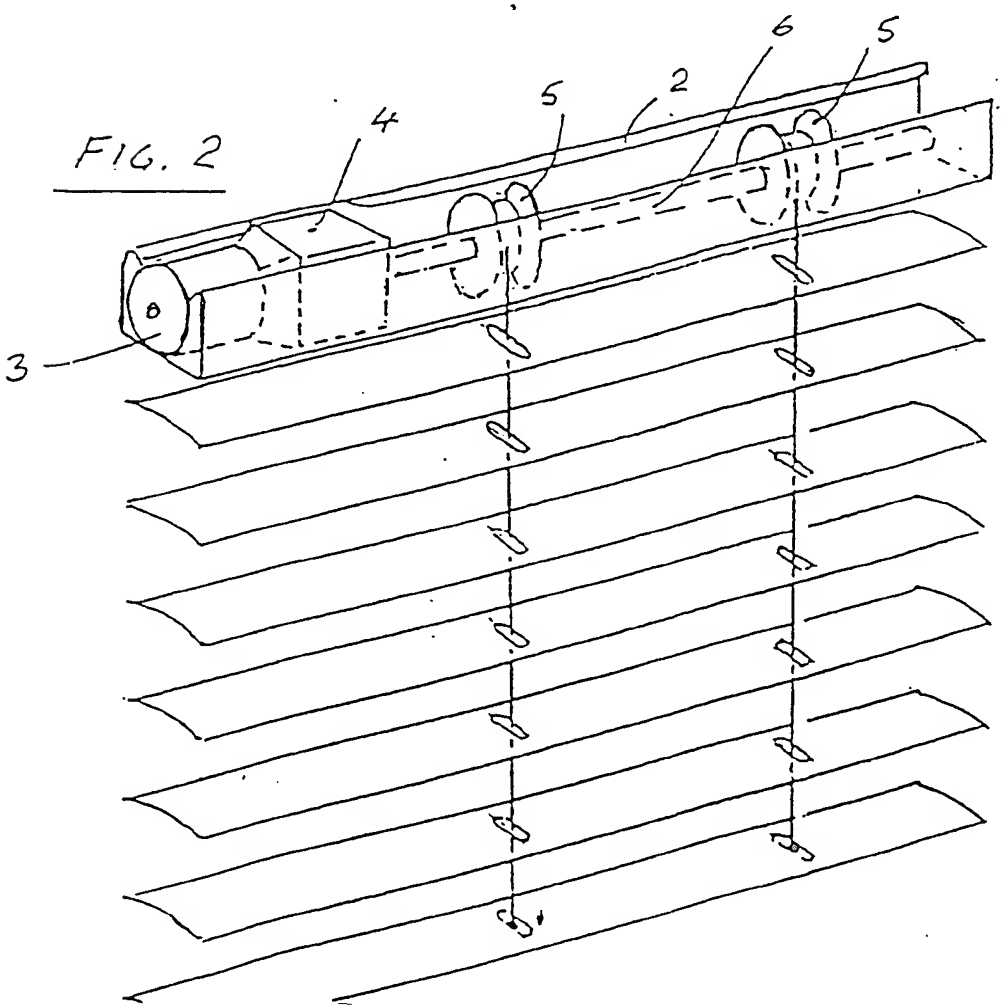


FIG. 5.

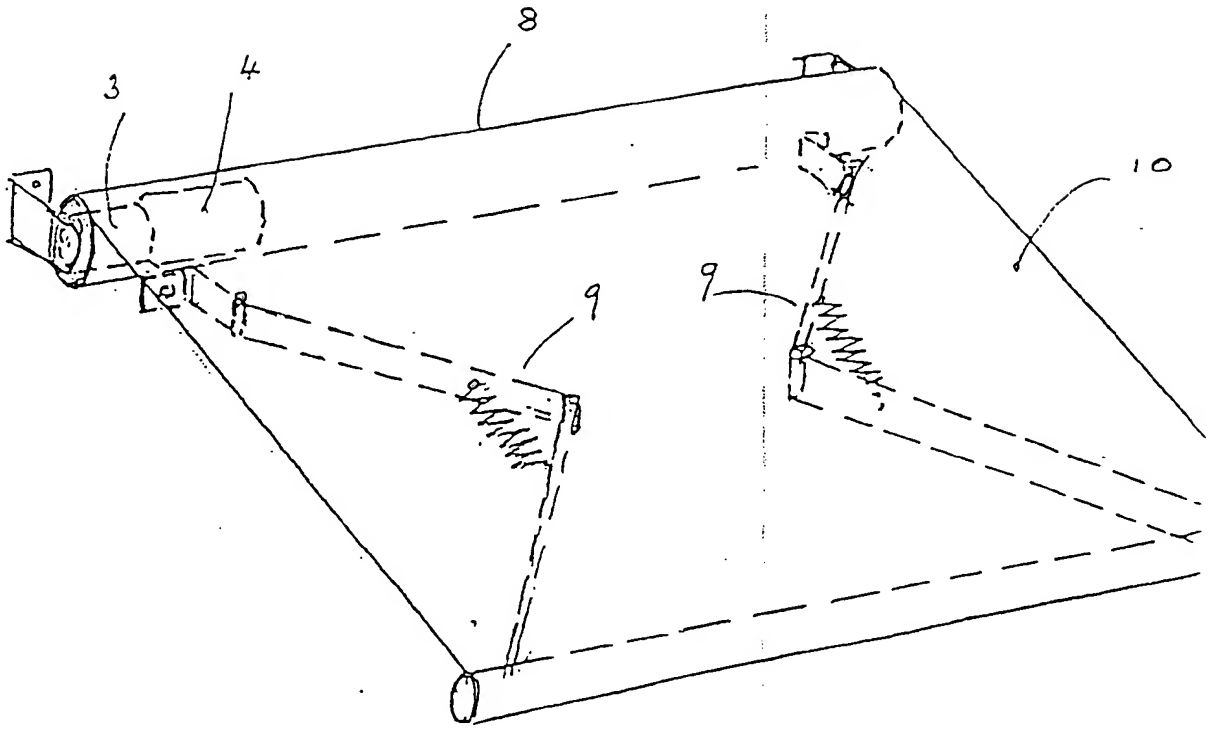
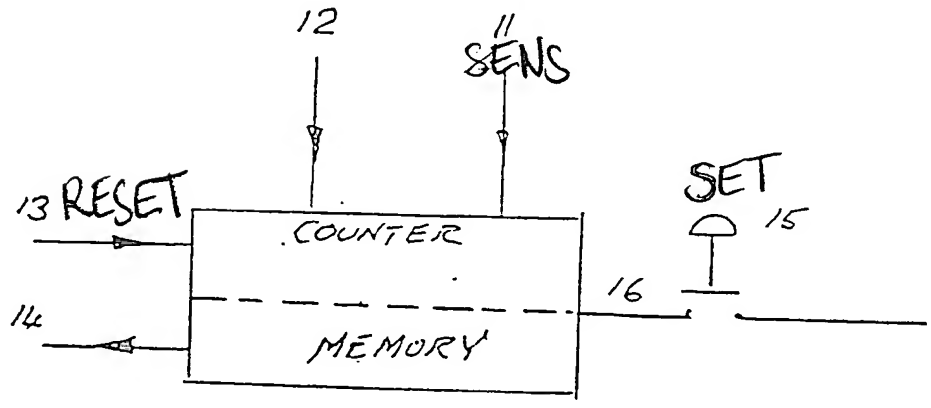


FIG. 6.



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EUROPEAN SEARCH REPORT

Application Number

EP 90 85 0014

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	FR-A-2 557 397 (KUNZ) * Page 2, lines 23-26; page 3, lines 14-23; page 7, lines 21-28; page 8, lines 12-33; figure 6 *	1-5	E 06 B 9/82
Y	---	8	
Y	DE-A-3 425 874 (GREIS) * Page 5, lines 22-32 *	8	
A	---		
	DE-A-3 526 140 (SM INDUSTRIAL CO.) * Column 3, lines 3-8; column 4, lines 26-29; column 11; column 12, lines 1-45 *	1-5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
E 06 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05-04-1990	KUKIDIS S.

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